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 PATENT APPLICATION

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BY: \_\_\_\_\_  
Margaret L. Goldstein

## 37 CFR 1.53(b) UTILITY PATENT APPLICATION TRANSMITTAL

Inventor(s): **Takeshi HIGUCHI**

Title: **Mechanism for Preventing Propagation of Driving Motor Noise and Vibration on a Tape Deck,  
 and Tape Deck Having the Same**

Enclosed are:

- ☒ Specification (19 pages), including Abstract and 14 claims.  
☒ 5 sheets of formal drawing containing 8 Figs.  
☒ Declaration/Power of Attorney  
☐ This application is filed pursuant to 37 CFR §1.53(b). The Declaration will be filed pursuant to 37 CFR §1.63.  
☒ Assignment and PTO-1595 Cover Sheet  
☒ Information Disclosure Statement, PTO-1449 and 3 prior art references  
☒ Preliminary Amendment

Certified copy of Priority Document(s) for 35 USC 119 priority claim: Japan Pat. Appls. Nos. 11-003540 filed May 24, 1999  
 and 11-007647 filed October 7, 1999.

The filing fee has been calculated as shown below:

	(Col. 1)	(Col.2)
FOR:	NO. FILED	NO. EXTRA *
BASIC FEE		
TOTAL CLAIMS	14 - 20 =	* 0
INDEP CLAIMS	3 - 3 =	* 0
<input type="checkbox"/> MULTIPLE DEPENDENT CLAIM PRESENTED <input type="checkbox"/> LATE FILING OF DECLARATION <input checked="" type="checkbox"/> ASSIGNMENT RECORDATION FEE		

\* If the difference in Col. 1 is less than zero, enter  
 "0" in Col. 2

## SMALL ENTITY

RATE	FEE
	\$ 345
X 9 =	\$
X 39 =	\$
+ 130 =	\$
+ 65 =	\$
+ 40 =	\$
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OTHER THAN  
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RATE	FEE
	\$ 690
X 18 =	\$
X 78 =	\$
+ 260 =	\$
+ 130 =	\$
+ 40 =	\$ 40
TOTAL	\$ 730

- ☐ The filing fee will be paid with our Response to Missing Parts of Application.  
☒ Please charge our Deposit Account No. 13-4550 in the amount of \$ 730. A duplicate copy of this sheet is enclosed.  
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☒ Any additional fees required under 37 CFR 1.16 and 1.17.

Dated: 4/28/2000

Respectfully submitted,

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicant : Takeshi Higuchi  
Serial No. :  
Filed : Concurrently  
For : MECHANISM FOR PREVENTING  
PROPAGATION OF DRIVING MOTOR  
NOISE AND VIBRATION ON A TAPE  
DECK, AND TAPE DECK HAVING SAME  
Examiner :  
Art Unit :

**PRELIMINARY AMENDMENT**

Hon. Assistant Commissioner for Patents  
Washington, D.C. 20231  
Sir:

Upon the according of a filing date herein, please amend the  
above-identified U.S. patent application as follows:

**IN THE SPECIFICATION:**

Page 4, line 13, change "wounded" to --wound--

Page 5, line 8, change "wounded" to --wound--

Page 6, line 13, change "is a perspective" to --is an exploded  
perspective--

Page 8, line 9, change "vises" to --screw fasteners--

" line 19, change "vises" to --screw fasteners--

Page 9, line 12, change "its internal diameter" to --a yoke hub  
passage--

Page 9, line 24, change "vises 34" to --screw fasteners 34--

Page 10, line 19, change "vises 34" to --screw fasteners 34--

**IN THE CLAIMS:**

Claim 4, line 5, change "wounded" to --wound--

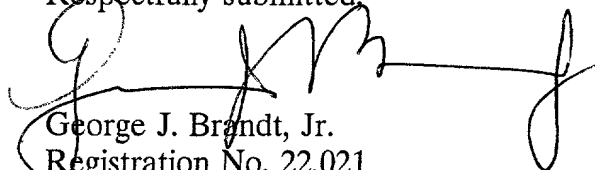
Claim 9, line 12, change "wounded" to --wound--

**REMARKS**

This amendment is submitted to correct obvious grammatical and inapt wording errors in the specification and claims. No issue of new matter is raised by these corrections.

An early action on the merits is solicited.

Respectfully submitted,



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# MECHANISM FOR PREVENTING PROPAGATION OF DRIVING MOTOR NOISE AND VIBRATION ON A TAPE DECK, AND TAPE DECK HAVING THE SAME

## BACKGROUND OF THE INVENTION

This invention relates generally to a mechanism for suppressing capstan driving motor noise and vibration on a videotape deck. Particularly, the invention relates to an art for preventing switching noise, caused by a switching control (e.g., a pulse width modulation (PWM) control) of a direct driving motor current in which a motor shaft is directly coupled to a capstan axis, from affecting images.

Conventionally, as to a capstan driving motor for a videotape deck, a method of full-wave or half-wave current linear driving is generally adopted. However, in order to achieve power-saving, high resistance to voltage, speed-up and suppression of heating, rather than this kind of the driving motor, it has been known to use a direct driving motor an output shaft of which can be directly connected to a capstan axis, and which is controlled by PWM method. As disclosed in a publication of unexamined Japanese Utility Model Application No. 59-117284, said direct driving motor controlled by PWM method is structured by a rotatable rotor provided with a 9 ring-shaped magnet, and a stator core facing to the magnet of said rotor and having a driving coil. Although this shows a brushless motor facing to a surface of the magnet, this structure can also be

applied to a brushless motor facing to a periphery of the magnet.

However, the above-mentioned PWM direct driving motor gives the driving coil higher voltage than the motor of the linear driving method does, and intermits (perform switching to) its current, as shown in FIG. 7, so that harmonics elements generate in a rising edge and a falling edge of the rectangular current. The harmonics elements become large switching noise, and the current containing the noise is induced on the stator core. In this state, since the motor is mounted on a deck chassis as an electrically conducting material in a conducting state, the current containing the noise is propagated to the deck chassis, and then, it is propagated through the deck chassis to the cylinder drum having a head, then further propagated to a video circuit and an audio circuit. Thus, the switching noise, which also contains frequency elements of a video band and a sound band, causes video screen noise (jitter) or audio noise. That is, the PWM direct driving motor gives the high frequency noise to the head amplifier and the like, which makes an unbearable state for watching and listening.

## SUMMARY OF THE INVENTION

This invention is made to solve the above-mentioned problems. The first object of the present invention is to provide a mechanism for avoiding propagation of driving motor noise and vibration on a tape deck, which, using a direct driving motor controlled by PWM method for driving a capstan, prevents switching

noise of said motor from propagating to a cylinder head drum, a video circuit and an audio circuit, thereby suppressing the video screen noise and audio noise.

Further, when the direct driving motor controlled by PWM method is mounted on the deck chassis by using an insulating material such as resin in order to suppress said noise, the vibration of the motor may be propagated to the deck chassis, which causes vibration resonant sound, or increases screen jitter. The second object of the present invention is to provide a mechanism for preventing propagation of driving motor noise and vibration on a tape deck, which can resolve the problem caused by said vibration.

In order to achieve the above-mentioned objects, according to one aspect of the present invention, a mechanism for preventing propagation of driving motor noise on a tape deck comprises a deck chassis, a pinch roller and a capstan axis for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing for the tape: wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by switching; and, wherein said motor is electrically insulated from said deck chassis.

In the above-mentioned constitution, when the direct driving motor is controlled by switching, current of comparatively high voltage is intermitted, so that switching noise containing

harmonics elements generates in the stator core of said motor. However, the motor and deck chassis are electrically insulated from each other, which prevents the switching noise from propagating to the deck chassis, and further avoids it from propagating to the cylinder drum, a video circuit and an audio circuit. Therefore, this constitution makes it possible to suppress video screen noise and audio noise.

In the above-mentioned constitution, the direct driving motor is mounted on the deck chassis through an insulator.

Further, in the above-mentioned constitution, said direct driving motor comprises a rotational axis as a capstan axis, a rotor which is mounted on said rotational axis, a stator core which is wound by a coil being supplied PWM control current and faces to said rotor, and a bearing holder which holds said stator core and supports said rotational axis, and said direct driving motor is mounted through said bearing holder on the deck chassis, wherein said bearing holder is made of an insulating material. If resin is used as the bearing holder, for example, this constitution prevents the switching noise from propagating to the deck chassis in a comparatively simple structure.

In the above-mentioned constitution, said cylinder drum can be mounted on the deck chassis through an insulator.

According to another aspect of the present invention, a mechanism for preventing propagation of driving motor noise on a tape deck comprising a deck chassis, a pinch roller and a capstan axis

for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing for the tape: wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by switching; and, wherein said motor comprises a rotational axis as a capstan axis, a rotor which is mounted in said rotational axis, a stator core which is wound by a coil being supplied switching control current and faces to said rotor, a bearing holder which is made of an insulating material for holding said stator core and supporting said rotational axis, and a motor PCB (printed circuit board) which is supported by said bearing holder and on which circuit elements for controlling the motor are mounted, and wherein said motor is secured on the deck chassis through the bearing holder; and, wherein said motor PCB is held in close to where the bearing holder is mounted on the deck chassis, and supported by a supporting member in an electrically insulating state at a distance from where the motor PCB is held.

In the above-mentioned constitution, the direct driving motor controlled by a switching control is mounted on the deck chassis by using the bearing holder made of an insulating material such as resin. Although vibration caused by a decrease in mechanical securing strength of said motor in an activation thereof may propagate to the deck chassis, the motor PCB is held by the bearing holder, and besides, supported by the supporting member in



the electrically insulating state from the deck chassis. Accordingly, this constitution prevents generation of vibration resonant sound and increase of screen jitter.

In the above-mentioned constitution, the supporting member can be composed of a boss made of resin which is provided extending toward the motor PCB on the deck chassis. Further, the supporting member can be an extending part of an insulating holder for holding members mounted on the deck chassis. Furthermore, the supporting member can be composed of a projection formed on the deck chassis, and an insulating material intervened between said projection and the motor PCB.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view showing a constitution of a deck chassis of a videotape deck according to a first embodiment of the present invention.

FIG. 2(a) is a top view of a PWM driving motor of the present invention, and FIG. 2(b) is a front view in half section of said motor.

FIG. 3 is a side view showing the PWM motor integrated into the deck chassis.

FIG. 4 is a view explaining a constitution in which an electrical insulation is made between a stator core and the deck chassis or a head cylinder.

FIG. 5 is a view in half section of the videotape deck

according to a second embodiment of the present invention.

FIG. 6 is a view in half section of the videotape deck according to a modified embodiment of the second embodiment of the present invention.

FIG. 7 is a view showing harmonics elements generating in a rising edge and a falling edge of a rectangular current.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT OF THE PRESENT INVENTION

Now, a mechanism for preventing propagation of driving motor noise on a tape deck according to the first embodiment of the present invention will be explained with reference to the drawings. FIG. 1 shows a schematic constitution of a deck chassis in a videotape deck 1. In the figure, the videotape deck 1 is equipped with a rotatable head cylinder 3 (cylinder drum), a supply reel axis 5, a take-up reel axis 6 and tape loading pins 11 and 12 on the deck chassis 2. Said head cylinder 3 has a recording and playing head. Said supply reel axis 5 and take-up reel axis 6 engage with and support a tape reel in a cassette (not shown in the figure). Said tape loading pins 11 and 12 are mounted on sliders 9 and 10 which are slid through long-hole rails 7 and 8 in order for the tape supplied from the tape reel to be reeled on the head cylinder 3. Further, the deck chassis 2 has an opening 13 for a capstan, through which a capstan axis 15 is stuck out. A pinch roller assembly 17, which is supported by a supporting axis 16, is provided with a pinch roller 18. The

capstan axis 15 and pinch roller 18 pinch the tape therebetween so as to convey it.

Said head cylinder 3 includes a rotatable cylinder 3a which has the recording and playing head, and includes a fixed cylinder 3b which has a boss for supporting a pivot of the rotatable cylinder 3a. The rotatable cylinder 3a is driven to rotate by a driving motor 3c which is fixed on the top end of said pivot. The deck chassis 2 has tilted mounts 4a and 4b on which the fixed cylinder 3b is secured by vises. Accordingly, the head cylinder 3 is mounted in at a predetermined angle for helical scanning. A head circuit board is secured on the fixed axis of the fixed cylinder 3b. The fixed cylinder 3b, which is desired to be electrically grounded, is mounted on the deck chassis 2 in a conducting state.

The capstan axis 15 is composed of a rotational axis of a pulse width modulation (PWM) direct driving motor 20 (hereinafter referred to as PWM motor). Said motor 20 has a motor printed circuit board (PCB) 21, and a bearing holder 22 for holding the capstan axis 15. The motor 20 is secured on the deck chassis 2 by screwing vises 34 through small holes 24 of the deck chassis 2 into three screw holes 23 which are provided on the bearing holder 22 on a surface touching the deck chassis 2. Further, a video PCB (later described), a sound head, an eraser head and other members (not shown in the figure) are also mounted on the deck chassis 2.

FIGS. 2(a) and 2(b) show a constitution of the PWM motor 20. As shown in the figure, said motor 20 comprises stator cores 26,

a driving magnet 27, a rotor yoke 28 and a core holder 30. The stator core 26, around which a coil 25 being supplied the PWM control current is wound, is constituted by a laminated silicon steel sheet. The driving magnet 27 is composed of ferrite shaped like a ring, and the like, which constitutes a rotor toward a periphery of the core 26. The rotor yoke 28 is composed of iron and the like for supporting the magnet 27. The core holder 30 holds the stator core. The stator core 26 is unitedly fixed on the bearing holder 22 with the motor PCB 21 on which a driver IC (integrated circuit) 21a and the like for controlling said motor are mounted, through the core holder 30 by a tightening member 31. The rotor yoke 28 is secured on the capstan axis 15 in its internal diameter. The rotor yoke 28 is provided with a pulley 32 for looping a belt, and a yoke periphery rubber 29 magnetized for detecting rotational speed.

FIG. 3 shows the deck chassis 2 into which the PWM motor 20 is integrated. The motor 20 is integrated into the deck chassis 2 via the bearing holder 22, and the motor PCB 21 is held by the bearing holder 22. Accordingly, the motor 20 and the motor PCB 21 are mounted at a distance from the deck chassis 2. The deck chassis 2 is loaded into a frame at corners by columns 33.

In this state, the PWM motor 20 electrically insulates at least between the stator core 26 and the deck chassis 2 or head cylinder 3 by using an insulating material such as resin in the tightening parts of the bearing holder 22 or vises 34.

Next, referring to FIG. 4, the explanation is given to an

effect of the constitution in which the stator core 26, and the deck chassis 2 or head cylinder 3 are electrically insulated as mentioned above. FIG. 4 is a schematic view of the above-mentioned constitution. The deck chassis 2 makes a connection to a video PCB 40 through a head-amplifier shield 41 (GND). The video PCB 40 includes a video head-amplifier circuit 42 and an audio amplifier circuit 43 both of which have to be grounded, so that they are connected to the deck chassis 2 in an electrically conducting state. Dashed-line arrows in the figure show propagation paths of electronic current of switching noise which is induced by the stator core 26. It is possible to prevent the switching noise from propagating to the head cylinder 3, video head-amplifier circuit 42, or audio amplifier circuit 43 by cutting the path at a point A, B or C. However, it is less desirable to cut the path at the point B or C in the light of performance of each circuit located prior to them.

It is desirable to cut the path at the point A. Resin is employed as the bearing holder 22 in the present embodiment. Otherwise, rather than the resin bearing holder 22, it is also possible to employ resin as the vises 34, and have an insulating sheet intervene between the deck chassis 2 and bearing holder 22. This constitution, using the comparatively simple constitution, makes it possible to prevent the switching noise containing harmonics elements which generate in an activation of the PWM motor 20 from propagating to the deck chassis 2 and head cylinder 3, and further makes it possible to avoid it from propagating to the video head-

amplifier circuit 42 or audio amplifier circuit 43. Therefore, this resolves a problem of noise on a video screen, or a problem of audio noise.

Moreover, the constitution in which the video amplifier circuit is contained in the head cylinder 3 eliminates the need for grounding the head cylinder 3 on the deck chassis 2. Consequently, in such a case, there is no need to electrically insulate between the stator core 26 of the PWM motor 20 and the deck chassis 2, and what is required is to electrically insulate between the stator core 26 (i.e., deck chassis 2) and the head cylinder 3 by using a resin spacer as the tilted mounts 4a and 4b on which head cylinder 3 is mounted (in this case, the path is cut at the point C).

FIG. 5 shows a videotape deck according to the second embodiment of the present invention, and a half section of the deck chassis 2 into which a PWM direct driving motor 20 is integrated. As is the case with the first embodiment, if the PWM motor 20 is secured on the deck chassis 2 by using the insulating material such as resin for electrical insulation, its mechanical securing strength is prone to decrease, so that vibration generating in the activation of the PWM motor 20 may propagate to and resonate the deck chassis 2. Therefore, measures to deal with the vibration are added in the second embodiment. As shown in FIG. 5, the PWM motor 20 and motor PCB 21 are mounted through the bearing holder 22 to the deck chassis 2. Further, the motor PCB 21 is mechanically supported by a supporting member 51 at a part away from the bearing holder 22

mounted in the deck chassis 2 in a state of electrically insulating to the deck chassis 2. That is, the motor PCB 21 is held in close to where the bearing holder 22 is mounted on the deck chassis 2, and besides, it is also supported at the end part thereof at a distance from the bearing holder 22 in an electrically insulating state from the deck chassis 2.

In the present embodiment, the supporting member 51 is structured by a boss formed of a resin, which is mounted on the deck chassis 2 toward the motor PCB 21. The end of the boss is desired to be fixed or adhered to the motor PCB 21 at its contacting surface by using an adhesive. Thus, the constitution of supporting the motor PCB 21 as mentioned above can prevent the vibration generating in the activation of the PWM motor 20 from propagating to the deck chassis 2. Concerning the resin-formed boss, the member which is formed by outsert molding in the deck chassis 2 is also applicable. As to the position supported by the supporting member 51, it is more desirable to distance it from the supporting position by the bearing holder 22 of the motor PCB 21 as much as possible in order to increase an effect of suppressing the vibration. It is also applicable to engage one end of the motor PCB 21 with a recessed part of the resin-formed boss.

Said supporting member 51 can be an extended part of an insulating holder for holding gear-related components which each exerts their actions of the tape deck mounted on the deck chassis 2. Also, the supporting member 51 can be some shock absorbing

material or vibration absorbing material such as insulating rubber.

FIG. 6 shows a modified embodiment of the second embodiment. In this embodiment, the supporting member 51 is comprised of a projection 52 which is formed in the deck chassis 2 by drawing processing, and an insulating sheet material 53 (e.g., vinyl chloride) which is intervened between the projection 52 and motor PCB 21. The projection 52 and insulating sheet 53, and the insulating sheet 53 and motor PCB 21 are adhered to each other on their contacting surfaces. Instead of the insulating sheet 53, an insulating coating film can be formed on a contacting surface of the motor PCB 21 and projection 52. The constitutions of above-described second embodiment and the modified embodiment thereof suppress the vibration of the motor PCB 21 caused by the vibration generating in the activation of the PWM motor 20. Accordingly, this prevents the vibration from propagating to the deck chassis 2, which suppresses vibration resonant noise and avoids image jitter from generating.

Having described preferred embodiments of the invention with reference to the accompanying drawings, it is to be understood that the invention is not limited to those precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims. For example, the above embodiment shows the constitution in which electrical insulation is given between the stator core of the PWM direct driving



motor and deck chassis, or between the stator core and cylinder drum, but the electrical insulation can be given to both of them. Further, an insulating structure other than the above-described constitution can also be applied.

**What is claimed is:**

1. A mechanism for preventing propagation of driving motor noise and vibration on a tape deck comprising a deck chassis, a pinch roller and a capstan axis for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing on the tape:

wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by current switching; and,

wherein said motor is electrically insulated from said deck chassis.

2. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 1, wherein said direct driving motor is controlled by a pulse width modulation (PWM) control.

3. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 2, wherein said direct driving motor is mounted on said deck chassis through an insulating material.

4. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 2, wherein said direct driving motor comprises a rotational axis as a capstan axis, a rotor which is mounted on said rotational axis, a stator core which is wound by a coil being supplied PWM control current and faces to

said rotor, and a bearing holder which holds said stator core and supports said rotational axis, and said direct driving motor is mounted through said bearing holder on the deck chassis:

wherein said bearing holder is made of an insulating material.

5. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 2, wherein said cylinder drum is mounted on said deck chassis through an insulator.

6. The tape deck which comprises the mechanism for controlling driving motor noise and vibration on a tape deck according to claim 2.

7. A mechanism for preventing propagation of driving motor noise and vibration on a tape deck comprising a direct driving motor controlled by current switching for driving a capstan axis, and a cylinder drum provided with a rotational cylinder having a head and a fixed cylinder:

wherein a stator core of said direct driving motor, said deck chassis and said cylinder drum are electrically insulated from each other.

8. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 7, wherein said direct driving motor is controlled by a pulse width modulation (PWM) control.

9. A mechanism for preventing propagation of driving motor noise and vibration on a tape deck comprising a deck chassis, a pinch

roller and a capstan axis for conveying a tape, a motor which is mounted on said deck chassis for driving said capstan axis, and a cylinder drum which is mounted on said deck chassis and provided with a head for magnetic-recording and playing on the tape:

wherein said motor is a direct driving motor in which a motor shaft is directly coupled to the capstan axis, and which is controlled by current switching;

wherein said motor comprises a rotational axis as a capstan axis, a rotor which is mounted in said rotational axis, a stator core which is wound by a coil being supplied switching control current and faces to said rotor, a bearing holder which is made of an insulating material for holding said stator core and supporting said rotational axis, and a motor PCB (printed circuit board) which is supported by said bearing holder and on which circuit elements for controlling the motor are mounted, and wherein said motor is secured on the deck chassis through the bearing holder; and,

wherein said motor PCB is held in close to where the bearing holder is mounted on the deck chassis, and supported by a supporting member in an electrically insulating state at a distance from where the motor PCB is held.

10. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 9, wherein said direct driving motor is controlled by a pulse width modulation (PWM) control.

11. The mechanism for preventing propagation of driving motor

noise and vibration on a tape deck according to claim 10, wherein said supporting member is composed of a projection which is provided toward the motor PCB on said deck chassis and made of an insulating material.

12. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 10, wherein said supporting member is an extended part of an insulating holder for holding members which are mounted on said deck chassis.

13. The mechanism for preventing propagation of driving motor noise and vibration on a tape deck according to claim 10, wherein said supporting member is composed of a projection formed on the deck chassis, and an insulating material intervened between said projection and said motor PCB.

14. The tape deck which is provided with the mechanism which suppresses driving motor noise and vibration on a tape deck according to claim 10.

## ABSTRACT

A direct driving motor for a videotape deck, in which a motor shaft is directly coupled to the capstan axis, and which is controlled by a PWM control, has a constitution in which a stator core and a deck chassis or a head cylinder are electrically insulated with each other. Also, the motor includes a bearing holder for holding a motor PCB (printed circuit board) one end of which is supported on the deck chassis in an insulating state. This constitution prevents current switching noise generating in the motor from propagating into the deck chassis, thereby suppressing video screen noise and audio noise, and also provides a measure for suppressing motor vibration.

FIG. 1

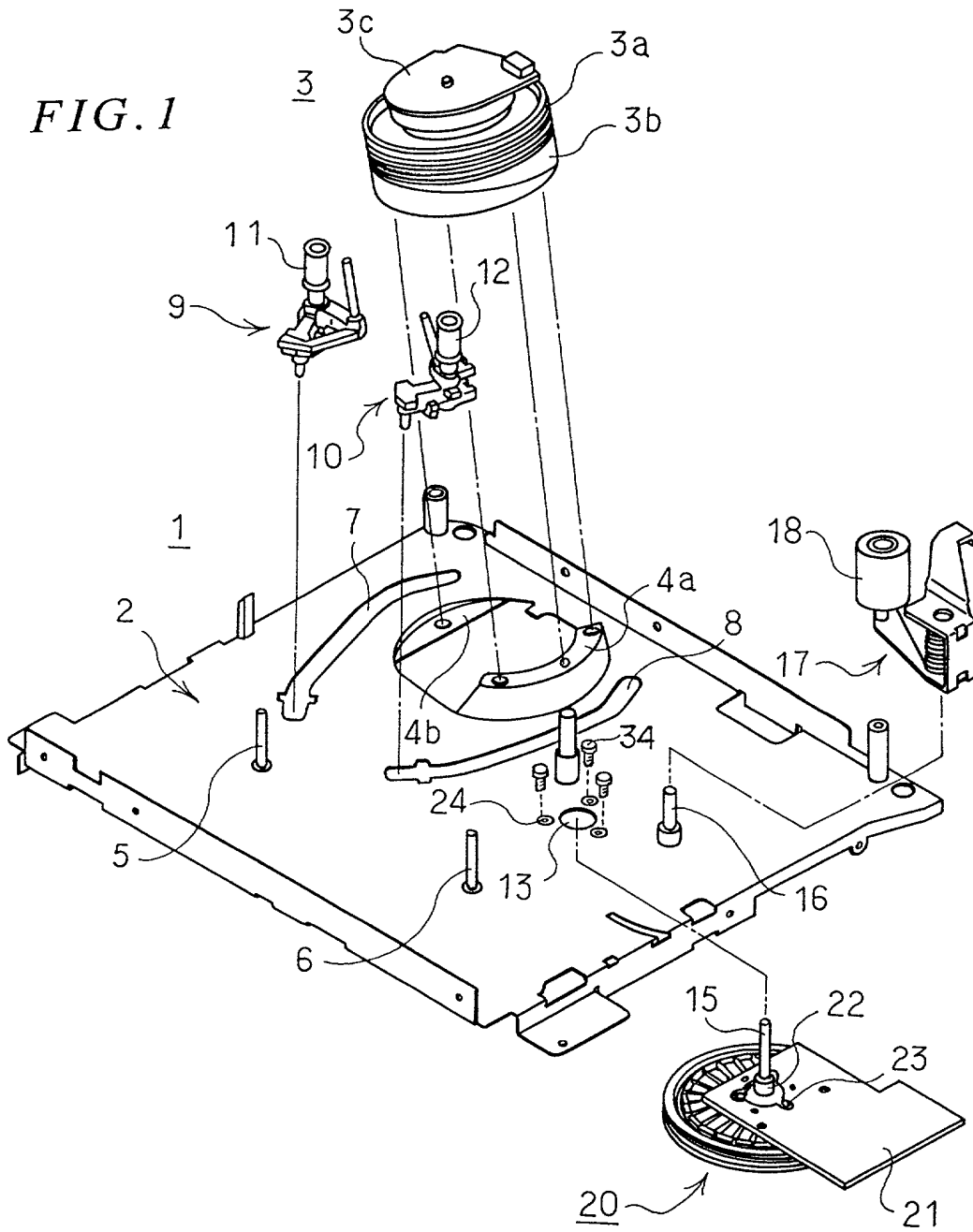


FIG. 2(a)

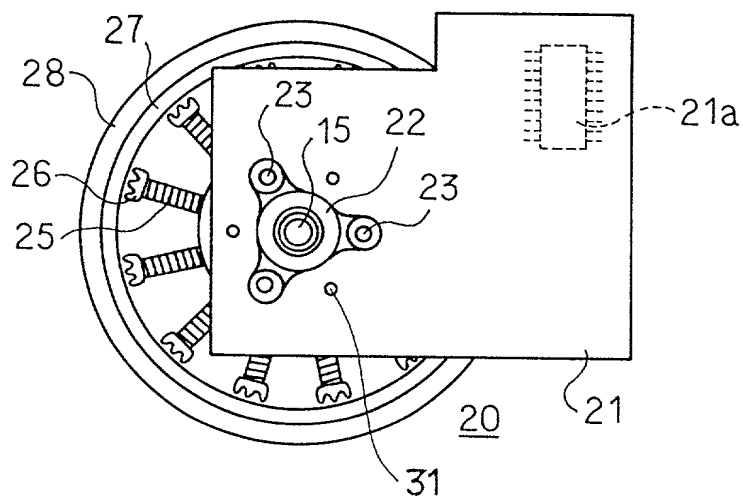
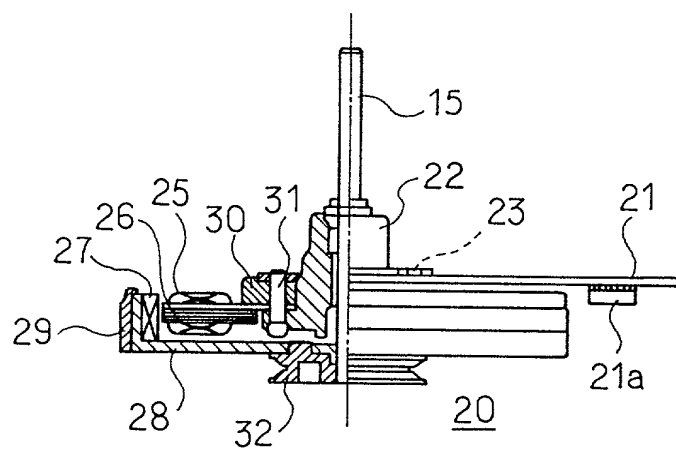


FIG. 2(b)





1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068 2069 2070 2071 2072 2073 2074 2075 2076 2077 2078 2079 2080 2081 2082 2083 2084 2085 2086 2087 2088 2089 2090 2091 2092 2093 2094 2095 2096 2097 2098 2099 2100 2101 2102 2103 2104 2105 2106 2107 2108 2109 2110 2111 2112 2113 2114 2115 2116 2117 2118 2119 2120 2121 2122 2123 2124 2125 2126 2127 2128 2129 2130 2131 2132 2133 2134 2135 2136 2137 2138 2139 2140 2141 2142 2143 2144 2145 2146 2147 2148 2149 2150 2151 2152 2153 2154 2155 2156 2157 2158 2159 2160 2161 2162 2163 2164 2165 2166 2167 2168 2169 2170 2171 2172 2173 2174 2175 2176 2177 2178 2179 2180 2181 2182 2183 2184 2185 2186 2187 2188 2189 2190 2191 2192 2193 2194 2195 2196 2197 2198 2199 2200 2201 2202 2203 2204 2205 2206 2207 2208 2209 2210 2211 2212 2213 2214 2215 2216 2217 2218 2219 2220 2221 2222 2223 2224 2225 2226 2227 2228 2229 2230 2231 2232 2233 2234 2235 2236 2237 2238 2239 2240 2241 2242 2243 2244 2245 2246 2247 2248 2249 2250 2251 2252 2253 2254 2255 2256 2257 2258 2259 2260 2261 2262 2263 2264 2265 2266 2267 2268 2269 2270 2271 2272 2273 2274 2275 2276 2277 2278 2279 2280 2281 2282 2283 2284 2285 2286 2287 2288 2289 2290 2291 2292 2293 2294 2295 2296 2297 2298 2299 2300 2301 2302 2303 2304 2305 2306 2307 2308 2309 2310 2311 2312 2313 2314 2315 2316 2317 2318 2319 2320 2321 2322 2323 2324 2325 2326 2327 2328 2329 2330 2331 2332 2333 2334 2335 2336 2337 2338 2339 2340 2341 2342 2343 2344 2345 2346 2347 2348 2349 2350 2351 2352 2353 2354 2355 2356 2357 2358 2359 2360 2361 2362 2363 2364 2365 2366 2367 2368 2369 2370 2371 2372 2373 2374 2375 2376 2377 2378 2379 2380 2381 2382 2383 2384 2385 2386 2387 2388 2389 2390 2391 2392 2393 2394 2395 2396 2397 2398 2399 2400 2401 2402 2403 2404 2405 2406 2407 2408 2409 2410 2411 2412 2413 2414 2415 2416 2417 2418 2419 2420 2421 2422 2423 2424 2425 2426 2427 2428 2429 2430 2431 2432 2433 2434 2435 2436 2437 2438 2439 2440 2441 2442 2443 2444 2445 2446 2447 2448 2449 2450 2451 2452 2453 2454 2455 2456 2457 2458 2459 2460 2461 2462 2463 2464 2465 2466 2467 2468 2469 2470 2471 2472 2473 2474 2475 2476 2477 2478 2479 2480 2481 2482 2483 2484 2485 2486 2487 2488 2489 2490 2491 2492 2493 2494 2495 2496 2497 2498 2499 2500 2501 2502 2503 2504 2505 2506 2507 2508 2509 2510 2511 2512 2513 2514 2515 2516 2517 2518 2519 2520 2521 2522 2523 2524 2525 2526 2527 2528 2529 2530 2531 2532 2533 2534 2535 2536 2537 2538 2539 2540 2541 2542 2543 2544 2545 2546 2547 2548 2549 2550 2551 2552 2553 2554 2555 2556 2557 2558 2559 2560 2561 2562 2563 2564 2565 2566 2567 2568 2569 2570 2571 2572 2573 2574 2575 2576 2577 2578 2579 2580 2581 2582 2583 2584 2585 2586 2587 2588 2589 2590 2591 2592 2593 2594 2595 2596 2597 2598 2599 2600 2601 2602 2603 2604 2605 2606 2607 2608 2609 2610 2611 2612 2613 2614 2615 2616 2617 2618 2619 2620 2621 2622 2623 2624 2625 2626 2627 2628 2629 2630 2631 2632 2633 2634 2635 2636 2637 2638 2639 2640 2641 2642 2643 2644 2645 2646 2647 2648 2649 2650 2651 2652 2653 2654 2655 2656 2657 2658 2659 2660 2661 2662 2663 2664 2665 2666 2667 2668 2669 2670 2671 2672 2673 2674 2675 2676 2677 2678 2679 2680 2681 2682 2683 2684 2685 2686 2687 2688 2689 2690 2691 2692 2693 2694 2695 2696 2697 2698 2699 2700 2701 2702 2703 2704 2705 2706 2707 2708 2709 2710 2711 2712 2713 2714 2715 2716 2717 2718 2719 2720 2721 2722 2723 2724 2725 2726 2727 2728 2729 2730 2731 2732 2733 2734 2735 2736 2737 2738 2739 2740 2741 2742 2743 2744 2745 2746 2747 2748 2749 2750 2751 2752 2753 2754 2755 2756 2757 2758 2759 2760 2761 2762 2763 2764 2765 2766 2767 2768 2769 2770 2771 2772 2773 2774 2775 2776 2777 2778 2779 2780 2781 2782 2783 2784 2785 2786 2787 2788 2789 2790 2791 2792 2793 2794 2795 2796 2797 2798 2799 2800 2801 2802 2803 2804 2805 2806 2807 2808 2809 2810 2811 2812 2813 2814 2815 2816 2

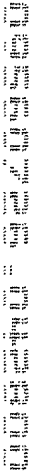


FIG. 5

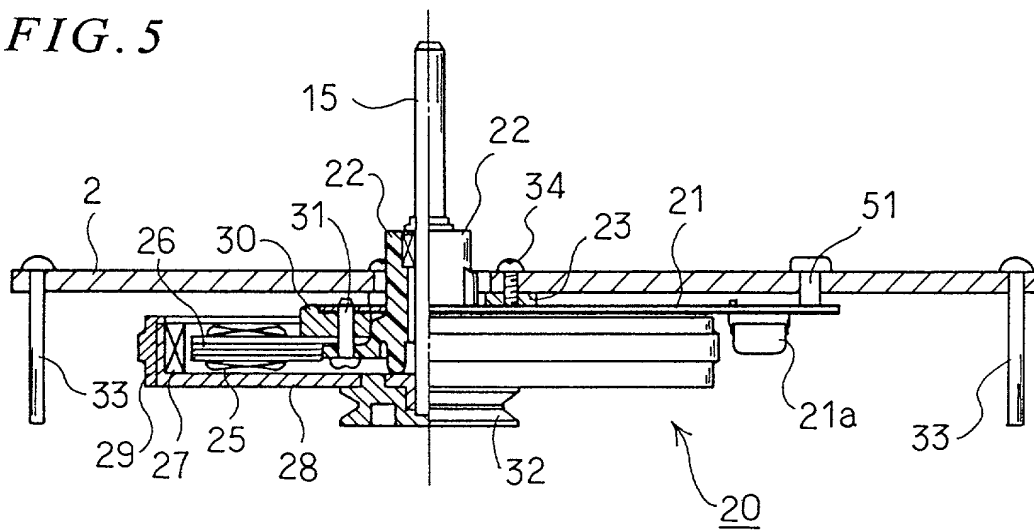
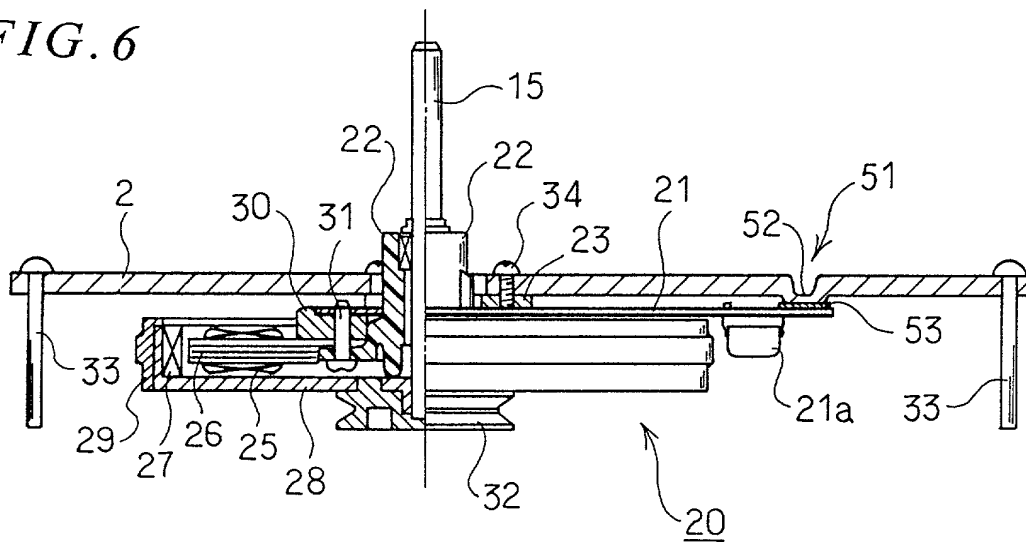
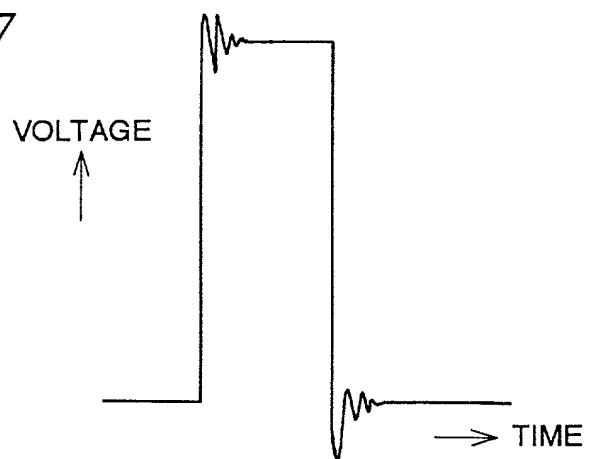


FIG. 6



*FIG. 7*



## Declaration and Power of Attorney For Patent Application

特許出願宣言書及び委任状

M/717-18

## Japanese Language Declaration

## 日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。

As a below named inventor, I hereby declare that:

私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

My residence, post office address and citizenship are as stated next to my name.

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

## MECHANISM FOR PREVENTING PROPAGATION

OF DRIVING MOTOR NOISE AND VIBRATION  
ON A TAPE DECK, AND TAPE DECK HAVING  
THE SAME

上記発明の明細書（下記の欄でx印がついていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☐ 月 日に提出され、米国出願番号または特許協定条約国際出願番号を \_\_\_\_\_ とし、  
(該当する場合) \_\_\_\_\_ に訂正されました。

☐ was filed on \_\_\_\_\_  
as United States Application Number or  
PCT International Application Number  
\_\_\_\_\_ and was amended on  
\_\_\_\_\_ (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

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I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.

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M1717-18

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Prior Foreign Application(s)

外国での先行出願 Utility Model 11-3540	JAPAN
(Number) (番号)	(Country) (国名)
Utility Model 11-7647	JAPAN
(Number) (番号)	(Country) (国名)

I hereby claim foreign priority under Title 35, United States Code, Section 119 (a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed.

Priority Not Claimed

優先権主張なし

24/05/1999

(Day/Month/Year Filed)

(出願年月日)

07/10/1999

(Day/Month/Year Filed)

(出願年月日)

☐

☐

私は、第35編米国法典119条(e)項に基づいて下記の米国外特許出願規定に記載された権利をここに主張いたします。

(Application No.)

(出願番号)

(Filing Date)

(出願日)

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(Application No.)

(出願番号)

(Filing Date)

(出願日)

(Application No.)

(出願番号)

(Filing Date)

(出願日)

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(Application No.)

(出願番号)

(Filing Date)

(出願日)

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s), or 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of Title 35, United States Code Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of application.

(Status: Patented, Pending, Abandoned)

(現況: 特許許可済、係属中、放棄済)

(Status: Patented, Pending, Abandoned)

(現況: 特許許可済、係属中、放棄済)

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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Japanese Language Declaration  
(日本語宣言書)

M1717-18

委任状: 私は下記の発明者として、本出願に関する一切の手続きを米特許商標局に対して遂行する弁理士または代理人として、下記の者を指名いたします。(弁理士、または代理人の氏名及び登録番号を明記のこと)  
Thomas R. Morrison (Reg. No. 27,361); Roger S. Thompson (Reg. No. 29,594); George J. Brandt, Jr. (Reg. No. 22,021); Mark A. Catan (Reg. No. 38720); Charles M. Doyle (Reg. No. 39,175)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (list name and registration number)  
Thomas R. Morrison (Reg. No. 27,361); Roger S. Thompson (Reg. No. 29,594); George J. Brandt, Jr. (Reg. No. 22,021); Mark A. Catan (Reg. No. 38720); Charles M. Doyle (Reg. No. 39,175)

書類送付先

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Mount Vernon, NY 10550

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Full name of sole or first inventor

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発明者の署名

日付

Inventor's signature

Date

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Funai Electric Co., Ltd.

ること

共同発明者についても同様に記載し、署名をす

Supply similar information and signature for  
joint inventors.